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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/511,777	10/18/2004	Hans-Joachim Mussig	536-009.12	6619
4955	7590	12/09/2005	EXAMINER HA, NGUYEN T	
WARE FRESSOLA VAN DER SLUYS & ADOLPHSON, LLP BRADFORD GREEN BUILDING 5 755 MAIN STREET, P O BOX 224 MONROE, CT 06468			ART UNIT 2831	PAPER NUMBER

DATE MAILED: 12/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/511,777

Applicant(s)

MUSSIG, HANS-JOACHIM

Examiner

Nguyen T. Ha

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 September 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwong et al. (US 5,578,848) in view of Bhattacharyya (US 6,700,771).

Regarding claim 1, Kwong et al. disclose a semiconductor capacitor having a first semiconductor layer which forms a first capacitor electrode (10) and which includes silicon, a second capacitor electrode (12) and a capacitor dielectric (18) therebetween the capacitor electrodes, and at least the first semiconductor layer including silicon is a first thin intermediate layer (14) serving as a diffusion barrier for oxygen.

Kwong et al. fail to disclose the dielectric including praseodymium oxide.

Bhattacharyya teaches a dielectric contains praseodymium oxide (column 11, lines 59-60).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the dielectric as taught by Bhattacharyya in Kwong et al., in order to provide a high k value for the capacitor.

Regarding claim 2, Kwong et al. disclose the first thin intermediate layer includes oxynitride (column 1, lines 51-54).

Regarding claim 3, the teaching of Kwong in view of Bhattacharyya includes all the claimed limitation discussed above with respect to claim 1, except for the thickness of the first thin intermediate layer is 0.5 nm or less. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the thickness of the first thin intermediate layer is 0.5 nm or less, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 4, Kwong et al. disclose the second capacitor electrode is formed from a second semiconductor layer and there is a second thin intermediate layer (16) between the second semiconductor layer and the capacitor dielectric and the second semiconductor layer includes praseodymium (figure 1).

Regarding claim 5, Kwong et al. disclose the second thin intermediate layer includes oxynitride (column 1, lines 51-54).

Regarding claim 6, Kwong et al. disclose the second thin intermediate layer includes silicon oxide (see, abstract).

Regarding claim 7, the teaching of Kwong in view of Bhattacharyya includes all the claimed limitation discussed above with respect to claim 4, except for the thickness of the first thin intermediate layer is 0.5 nm or less. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the thickness of the first thin intermediate layer is 0.5 nm or less, since it has been held that where the

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general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 8, it is noted that the oxynitride as taught by Kwong et al. of the first or the second thin intermediate layer has a concentration ratio of oxygen to nitrogen of 1 : 1.

Regarding claim 9, Kwong et al. disclose a memory cell for dynamic random access memory, which includes a semiconductor capacitor (column 2, lines 62-64).

Regarding claim 10, Kwong et al. disclose a field effect transistor comprising a substrate, a gate oxide layer and a gate electrode which includes a semiconductor capacitor, wherein the substrate forms the first capacitor electrode, the gate electrode forms the second capacitor electrode and the gate oxide forms the capacitor dielectric (figures 1-2).

Regarding claim 11, it is noted that the oxynitride as taught by Kwong et al. of the first or the second thin intermediate layer has a concentration ratio of oxygen to nitrogen of 1 : 1.

### ***Conclusion***

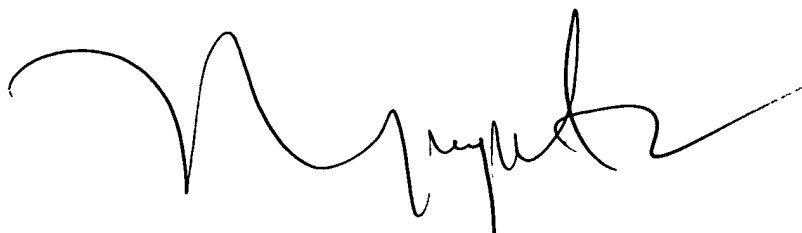
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nguyen T. Ha whose telephone number is 571-272-1974. The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on 571-272-2800 ext. 31. The fax phone

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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Nguyen T. Ha', with a stylized, flowing script.

**Nguyen T. Ha**  
**December 1, 2005**